Remarks

Claims 1-16 were pending. Claims 8 and 11-16 have been canceled. Claims 1-7 and 9-10 have been amended, with claims 1, 3, and 6 remaining as independent claims. Support for the amendment is found in original claim 3 (that included similar features), and in Figure 3 and the related discussions on pages 8-10, for example. The reference to an upper limit of the number of first tasks finds support at page 10, lines 10-11 ("activated tasks are limited to the high priority tasks").

Claims 1-16 were rejected under Section 112, first paragraph, and have been amended. The references to "new tasks" have been removed. Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 1 and 6 were rejected as unpatentable over ONEILL et al. 6,085,287 in view of JOHNSON et al. 6,308,245 and HOOMAN et al. 2003/0172104. Claims 2 and 7 were rejected further in view of BALA 6,351,844.

Claims 2-4, 7-9 11, 13-14 and 16 were rejected as unpatentable over ONEILL et al. in view of NIITAKA et al. EP 0400500; WILLIAMS 2001/0042090; and RYAN 5,367,656. However, it is noted that the discussion of these claims in paragraph 13 refers to ONEILL et al., JOHNSON et al. and HOOMAN et al., and on this basis paragraph 12 has been interpreted to refer to the latter references, rather than the ones listed therein.

Claims 5, 10, 12, and 15 were rejected as unpatentable RYAN, ONEILL et al., JOHNSON et al., HOOMAN et al., and HORII et al. JP 08-077025A.

The claims have been amended and reconsideration and withdrawal of the rejections are respectfully requested.

The amended claims define a disk array control apparatus and method in which a control element generates a multitask for processing a single I/O request, the multitask including first tasks with a first priority and second tasks with a second priority that is lower than the first priority, where an upper limit of a number of the first tasks is a first number. A first element calculates a cache hit ratio at a disk cache memory, and when the single I/O request is input to the disk array control apparatus a second element executes the first tasks until the number of the first tasks reaches the first number, and executes the second tasks and the first tasks when the number of the first tasks reaches the first number, except that the second element executes only the first tasks when the calculated cache hit ratio is above a prescribed value even if the number of first tasks reaches the first number.

The applied references have been carefully considered and they do not disclose or suggest, alone or in combination, a control element that generates a multitask for processing a single I/O request, wherein only the first (higher priority) tasks of the multitask (for processing the single I/O request)

10

are executed when the calculated cache hit ratio is above a prescribed value even if the number of first tasks reaches the upper limit of such tasks.

In paragraph 13 of the Official Action is an acknowledgment that ONEILL et al., JOHNSON et al., and HOOMAN et al., do not disclose limiting the number of higher priority tasks when the cache hit ratio is above a prescribed value. The Official Action relies on RYAN for the suggestion to modify these references to include this feature.

However, RYAN discloses that a miss prediction operation (a lower priority operation) is halted when the cache hit ratio is above a threshold and that the regular cache accessing continues. These two operations (miss prediction and regular cache accessing) are separate operations that are dissimilar and not part of a multitask that is generated for processing a single I/O request. There is no suggestion in RYAN (or the other references) to limit tasks from a multitask that is generated for processing a single I/O request, when the cache hit ratio is above a prescribed threshold. RYAN limits dissimilar tasks that define completely different operations (i.e., miss prediction and regular cache accessing), but does not go so far as to suggest limiting tasks from a multitask as claimed in the amended claims.

That is, the invention of the amended claims prioritizes tasks from a single I/O request, and executes only the higher priority tasks when the cache hit ratio is above the prescribed

11

value. Further, the number of first (higher priority) tasks in the multitask is limited. Thus, the invention is able to limit the number of executed operations within the multitask when the cache hit ratio is high. By limiting the number of executed operations, the invention is able to prevent a page-out of the disk cache memory and thus increase the efficiency of operation for the single I/O request. The applied references do not disclose or suggest doing this for a single I/O request and thus the amended claims avoid the rejections under §103.

In view of the present amendment and the foregoing remarks, it is believed that the present application has been placed in condition for allowance. Reconsideration and allowance are respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

YOUNG & THOMPSON

/Thomas W. Perkins/
Thomas W. Perkins, Reg. No. 33,027
209 Madison Avenue, Suite 500
Alexandria, Virginia 22314
Telephone (703) 521-2297
Telefax (703) 685-0573
         (703) 979-4709

TWP/lk